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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/035,684      | 11/01/2001  | Eric Karplus         |                     | 4600             |

30611 7590 09/26/2003

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EXAMINER

GABOR, OTILIA

ART UNIT PAPER NUMBER

2878

DATE MAILED: 09/26/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/035,684

Applicant(s)

KARPLUS ET AL.

Examiner

Otilia Gabor

Art Unit

2878

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 01 November 2001 and 15 November 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 November 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 4-9, 11-14, 17, 18, 20, 21 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Rougeot et al. (U. S. Patent 5144141).

Rougeot et al. discloses an apparatus and method for determining the position, energy and time of incidence of radiation, the apparatus comprising an internal gain avalanche photodiode 152 as the solid state device where through a charge separation process the incident photons are transformed into electrical signals which signals are then sent to a processing circuit 200 and analysis circuit 280 for determining the position, time and energy of the incident radiation. See Fig.1 and Col.5, lines 17-19. This method exhibits a high degree of spatial and energy resolution.

An internal gain avalanche photodiode inherently includes a plurality of electrically conductive structures (an anode and cathode at least) where through the incidence of radiation on the first electrode mobile electrical charges are created. These charges are separated and steered (through application of electric fields or steering electrodes) towards the second electrode of opposite polarity which includes a region of avalanche multiplication region where the charges are multiplied and later collected at the second

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electrode. These collected charges constitute the electrical signal response to the incident radiation.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 3, 10, 15, 16, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rougeot et al. and further in view of Iwanczyk et al. (U. S. Patent 6541836).

Regarding claims 3, 10 and 19 Rougeot et al. fails to use a photomultiplier as the solid state device, however since he does not limit the application to only avalanche photodiodes (see Col.5, lines 17-20) and since it is well known in the art that solid state

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photomultipliers with internal gain are conventionally used in the field to fulfill the same function as the avalanche photodiode, as shown in Iwanczyk et al., it would have been obvious to one of ordinary skill in the art to use a PMT as the solid state device for it constitutes only a matter of design choice.

Regarding claims 15 and 16 Rougeot et al. does not disclose the specifics of the avalanche photodiode, and thus fails to disclose one or more termination lines between the conductive structures whereby the termination lines are used to eliminate geometric distortions in the electrical signals, however one of ordinary skill in the art would have been motivated to use the combination of guard electrodes 206, 212, 213 (i.e., terminals) as disclosed by Iwanczyk et al. in order to shape the distribution of the electric field used to drive the charges to the anode. This uniform distribution eliminates the premature avalanche breakdown at the edges of the anode and thus fabrication errors (geometric distortions) will be eliminated. Since this represents a problem in the field of avalanche multiplication one of ordinary skill in the art would have been motivated to use the guard rings to eliminate geometric distortion errors from the final electric signal output from the anode. See Figs.3A,3B and Col.9, lines 13-28.

### ***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Iwanczyk et al. (U. S. Patent 6521894), Huth (U. S. Patent 5146296), Nicoli et al. (U. S. Patent 5461226).

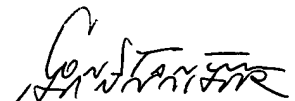
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Otilia Gabor whose telephone number is 703-305-0384. The examiner can normally be reached on Monday-Friday between 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on 703-308-4852. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

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CONSTANTINE HANNAHER  
PRIMARY EXAMINER  
GROUP ART UNIT 2878